

BC2 Tablet Interface User Manual

SunovaWorX Inc.

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Chapter 1

Introduction

1.1 Purpose

BC2 Tablet Interface ¹ is the main computer program for remote-controlling SunovaWorX Broadcaster 2 remote engine controllers. It is the program you use when you want to start, stop, or otherwise control a pump remotely.

1.2 Installation

BC2 Tablet Interface comes pre-installed on any tablet computers supplied by SunovaWorX.

1.3 Starting

To start BC2 Tablet Interface, double-tap the BC2 Tablet Interface icon. Figure 1.1 on page 2 shows what the icon looks like.

If you have not yet completed the first-time set-up of pumps on a tablet, you will be prompted to run the BC2 Config tool first. BC2 Tablet Interface cannot do much until you have entered the basic information needed for it to communicate with your pumps. Figure 1.2 shows what this message looks like.



Figure 1.1: BC2 Tablet Interface program icon

¹In previous versions of this software, we called this program 'BC2GUI', where *GUI* means 'graphical user interface'.

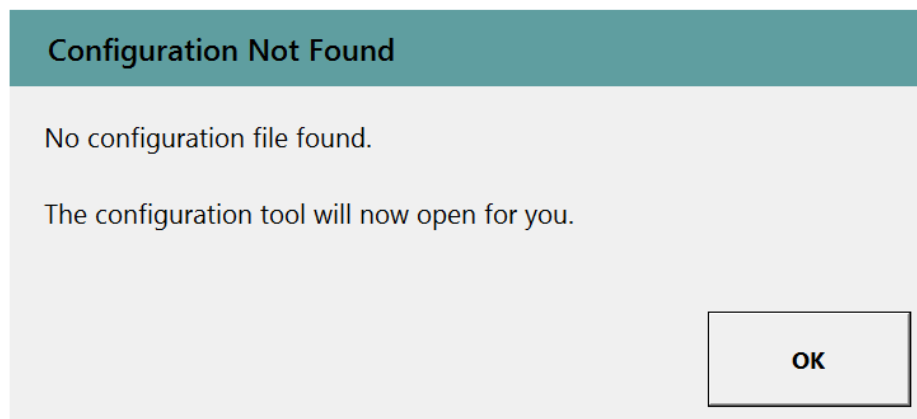


Figure 1.2: Configuration Not Found message

Chapter 2

Usage

The main screen of BC2 Tablet Interface is composed of three main parts: the status bar, the side bar, and the main display. These are labelled 1, 2, and 3, respectively in Figure 2.1 on page 4. This document is organized around documenting the features specific to these areas.

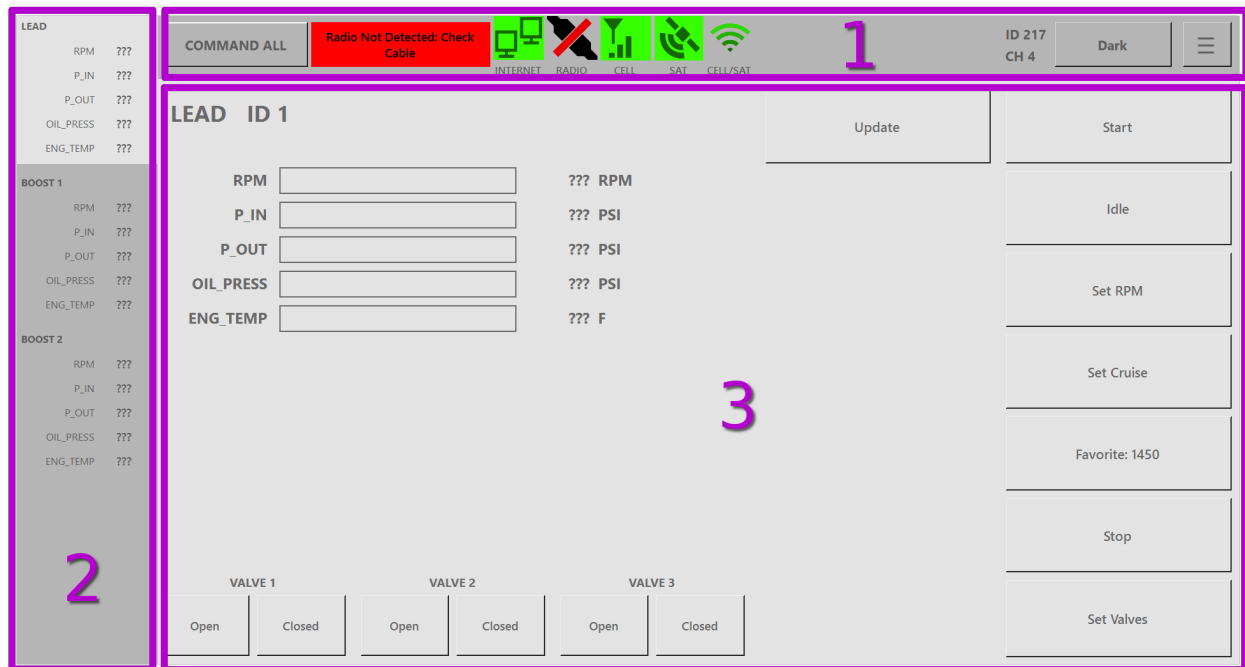


Figure 2.1: BC2 Tablet Interface Main Screen Areas

2.1 Status/Menu Bar

The status bar (indicated with the number 1 in Figure 2.1) functions as a means of monitoring and controlling a pumping operation, independent of individual pumps. This includes status icons, error messages, and menu buttons for managing the operation of BC2 Tablet Interface itself.

2.1.1 Command All Button

The **Command All** button provides the ability to send an *All Stop* or *All Idle* command to all pumps. It is in the status bar so that it is visible and available at all times, regardless of which pump is being viewed and controlled at a particular time.

To send an All Stop command:

1. Tap the **Command All** button.
2. In the dialog window that opens, tap the **STOP** button.

To send an All Idle command:

1. Tap the **Command All** button.
2. In the dialog window that opens, tap the **Idle** button.

2.1.2 Error Message

To the right of the Command All button is a space for an error message, when visible. In Figure 2.1 on page 4 an example error message is displayed: **Radio Not Detected: Check Cable**.

Error messages include, but are not limited to:

- **On Battery Only: Plug in tablet!** – Indicates that the tablet does not think it is plugged into AC power.
- **Radio Not Detected: Check Cable** – Indicates that a radio is not detected and could indicate a connection problem or failure. Typically indicates a loose radio cable.
- **No Pump Data Found: Run BC2 Config** – No pump configuration data found. This can happen if there *is* a configuration data file, but no pumps defined in that file.
- **Radio Reports Voltage Problem** – Indicates that the radio is reporting a low voltage error.
- **Radio Reports Unknown Problem** – Indicates that the radio is reporting a failure to initialize. If this error persists: indicates a radio hardware failure.

2.1.3 Internet Icon

The Internet icon indicates the connection state of the Internet communication system. Table 2.1 describes the various states and their meaning.

2.1.4 Radio Icon

The radio icon indicates the status of the local radio device connected to the tablet. It does not indicate any status about the RF connection between the radio and other radios in the network, but does indicate when something is being transmitted or being received. Table 2.2 illustrates the icon states.

Icon	Meaning
	The default state. When persistent, indicates that the tablet cannot "see" the SunovaWorX server at all.
	An error state. Indicates that the tablet <i>can</i> "see" the SunovaWorX server but that the server has rejected the connection.
	Indicates that a connection exists.
	Indicates data being sent from the tablet.
	Indicates data being received from the server.

Table 2.1: Internet icon states.

2.1.5 BC1 Compatibility Indicator

When enabled in BC2 Config, the BC1 Compatibility mode is indicated in the text below the radio icon: instead of saying RADIO the text reads RADIO BC1/2. This indicates that the radio is operating in a mode that allows for communication with BC1 radios as well as other BC2 devices with this option enabled.

2.1.6 Cell Icon

The cell icon indicates the status of the cellular communication aspect of the IDP-782 cell-sat module. Cell and satellite communication operate somewhat independently and so there are two separate icons. Table 2.3 illustrates the icon states.

2.1.7 Sat Icon

The sat icon indicates the status of the satellite communication aspect of the IDP-782 cell-sat module. Cell and satellite communication operate somewhat independently and so there are two separate icons. Table 2.4 illustrates the icon states.

Icon	Meaning
	Indicates no radio detected.
	An error state. Indicates that the radio is physically connected to the tablet but that it is not functioning correctly.
	The radio is working but has not received any data in the last 60 seconds. If this state persists with the radio in range of other radios, it could indicate an issue with the radio antenna or radio settings.
	The ideal state—radio is connected and considers itself healthy, having received data in the last 60 seconds.
	Indicates data being sent to the radio for broadcast.
	Indicates data being received from the tablet's radio.

Table 2.2: Radio icon states.

Icon	Meaning
	Indicates cell-sat module not detected.
	An error state. Indicates that the cell-sat module is physically connected to the tablet but cell communication is not working correctly.
	Cell connection beginning to be built up. This icon blinks.
	Indicates a basic connection to a cell tower with at least some signal strength. This icon blinks.
	Indicates a connection to the Internet has been established but still waiting to connect to the gateway server on the Internet. This icon blinks.
	OK. Indicates extremely low signal strength.
	OK. Indicates very low signal strength.
	OK. Indicates low signal strength.
	OK. Indicates good signal strength.
	OK. Indicates very good signal strength.
	OK. Indicates extremely good signal strength.

Table 2.3: Cell icon states.

Icon	Meaning
	Indicates cell-sat module not detected.
	An error state. Indicates that the cell-sat module is physically connected to the tablet but sat communication is not working correctly.
	Module is in start-up, and is waiting for GPS aquisition. This icon blinks.
	Searching for satellite. This icon blinks.
	Building connection with satellite 1/8. This icon blinks.
	Building connection with satellite 2/8. This icon blinks.
	Building connection with satellite 3/8. This icon blinks.
	Building connection with satellite 4/8. This icon blinks.
	Building connection with satellite 5/8. This icon blinks.
	Building connection with satellite 6/8. This icon blinks.
	Building connection with satellite 7/8. This icon blinks.
	Building connection with satellite 7/8. This icon blinks.
	Connected. Signal strength is adequate.
	Connected. Signal strength is good.
	Connected. Signal strength is very good.
	Was connected, but inadequate signal strength.

Table 2.4: Sat icon states.

2.1.8 Cell-Sat Send Icon

When sending data via the cell-sat module, BC2 Tablet Interface indicates that a message has been queued for delivery but not yet sent. Figure 2.2 on page 10 illustrates one frame of this animated icon. Normally, this icon is not visible, and becomes visible only when there is a message queued and not yet sent. If this icon becomes visible and stays visible, it indicates that a message is trying to be sent but that the cell-sat module is having trouble successfully sending it.



Figure 2.2: Cell-Sat Send Icon

2.1.9 Tablet ID and Channel

For convenience and trouble-shooting purposes, the tablet ID and the current radio channel are displayed in the status bar. They are shown directly to the left of the brightness toggle button.

2.1.10 Brightness Toggle

BC2 Tablet Interface supports two display modes: a night/dark mode and a day/light mode. In dark mode, the buttons in the program are darker and easier to see at night. Similarly, in light mode, the buttons in the program are lighter and better-suited for daylight operations.

When in dark mode, the button text is **Light** and when in light mode, the button text is **Dark**. Tap the button to switch between modes.

2.1.11 Menu Button

The main program menu button is located at the top-right of the screen, to the very right of the status bar. It contains several buttons:

- Tablet Connection – Configure connection to radio and cell-sat module.
- BC2 Config – Closes BC2 Tablet Interface and opens BC2 Config Provides a fast way of changing configuration.
- About – Information about BC2 Tablet Interface for example, version information.

- Exit – Terminates BC2 Tablet Interface.

2.2 Operating Pumps on the Main Display

The main display is the portion of the screen that shows detailed data for a specific pump, as well as provides buttons for operating that pump. To be clear: everything within the main display is relevant to one specific pump – pressing the **Update** button will only request data from the pump currently displayed in the main display.

2.2.1 Update

The **Update** button issues a request to a pump for its most recent data. This button blinks while an outstanding update request has gone unanswered.

2.2.2 Start

The **Start** button issues a request to a pump's engine to start. This button blinks grey while an outstanding start request has gone unanswered, and blinks yellow when the engine reports that it is preparing to start. The yellow blinking is designed to mirror the safety beacon that blinks and beeps when Broadcaster 2 (BC2) is about to start.

2.2.3 Idle

The **Idle** button commands a pump to go to its idle speed, as defined in its BC2 engine controller settings. While the command has been issued but not yet responded to, the button blinks grey. When an engine controller reports that the engine is *idle*, the **Idle** button is green.

When BC2 Tablet Interface receives a confirmation that the engine controller is at idle or is in the process of going to idle, the data value for this pump shows as **IDLE** rather than a numeric value. This is to indicate that BC2 Tablet Interface knows the state of the engine controller, but does not know the intended target idle RPM as set on the engine controller.

2.2.4 Set RPM

When pressed, the **Set RPM** button provides a dialog box for choosing a specific engine speed. Figure 2.3 on page 12 illustrates this dialog box.

When choosing a speed, the value is displayed in the middle of the dialog box in the white rectangle. There are three options for choosing a speed:

- The up and down arrow buttons.
- A preset value. There are three presets; each are settable per-pump in BC2 Config.
- Two *favorite* values: A and B. In many situations, there are one or two speeds that are frequently desired for a particular engine in a particular situation. Use the **Make Favorite A** to set the currently-selected speed as the new *Favorite A* value. Use the **Make Favorite B** to set the currently-selected speed as the new *Favorite B* value. Refer to Section 2.2.6 on page 13 for information regarding the operation of the Favorite A and B buttons.

With the desired engine speed chosen, tap **SET**. This closes the dialog box and issues the command to the engine to adjust to the selected speed. Like the **Idle** button, the **Set RPM** button blinks grey while the command has been sent and not yet acknowledged, and is solid green when acknowledged. Additionally, the current commanded RPM value is indicated next to the Set RPM button, as shown in Figure 2.4 on page 13.

If the value you want is close to an existing preset or favorite, use a preset or favorite followed by the arrow buttons to get the exact value, before tapping **SET**.

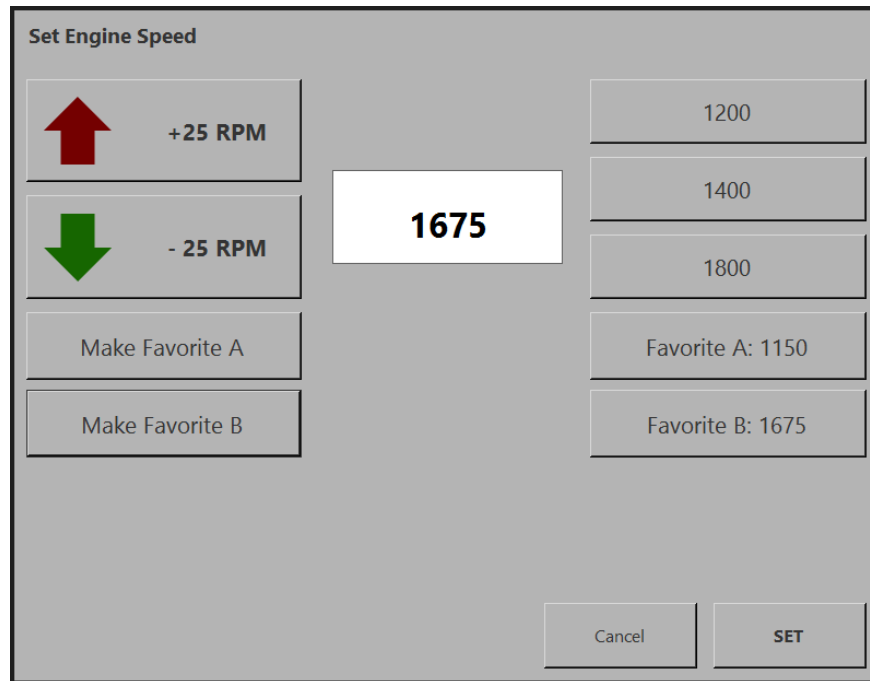


Figure 2.3: Set RPM Dialog

2.2.5 Set Cruise

When pressed, the **Set Cruise** button provides a dialog box for putting BC2 into pump cruise mode. In this mode, the speed of the engine is not explicitly set but is determined based on inlet pressure, and is meant for situations where the pump should intelligently respond to changes in inlet pressure. This mode is designed to avoid the situation where inlet pressure drops while the pump continues at a certain speed, producing conditions that can lead to cavitation. It also handles the situation where inlet pressure is high and the pump needs to work harder to keep up with the increase in pressure.

Figure 2.5 on page 13 illustrates this dialog. Using this dialog involves setting two values, a **Maximum** and a **Minimum** pressure, measured in Pounds per Square Inch (PSI). Each value has two green down arrows to the left, and two red arrows to the right. Each arrow will increase or decrease its value by 1 or 5, as indicated on each button. Use the ± 5 buttons to quickly get close to the desired value and use the ± 1 buttons to get the exact value.

The maximum value must not be less than the minimum, and this is enforced by disabling the

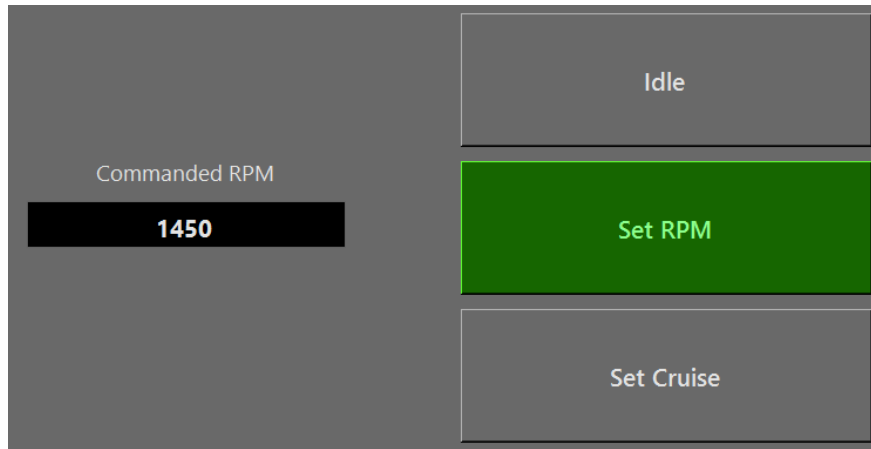


Figure 2.4: Commanded RPM indicated next to Set RPM button.

arrow buttons depending on the currently-selected values. When an arrow button is disabled, its arrow turns grey. Additionally, values cannot be set less than the minimums set in BC2 Config.

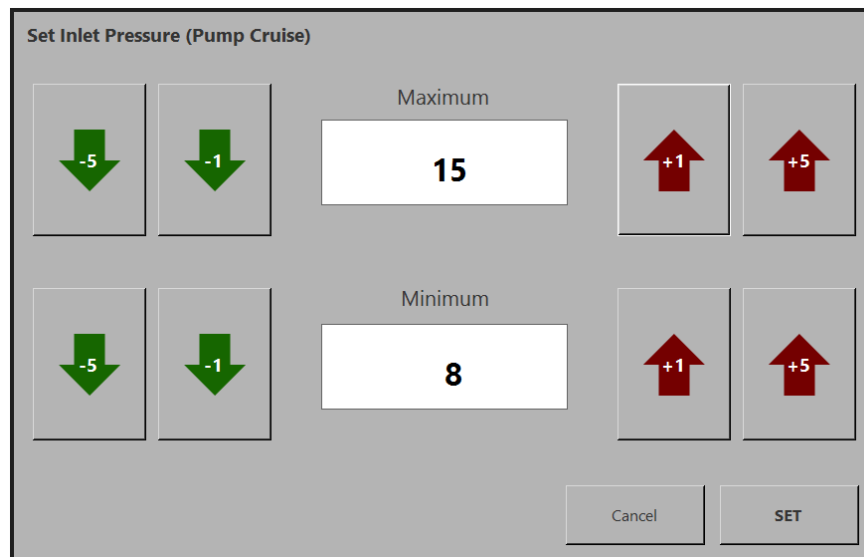


Figure 2.5: Set Cruise Dialog

2.2.6 Favorite A and Favorite B

Tapping the **Favorite A** button simply commands the engine to run at the currently-defined Favorite A speed. Similarly, the **Favorite B** button, when pressed, commands the engine to run at the currently-defined Favorite B speed.

Change the favorite speeds using the **Set RPM** dialog described in Section 2.2.4 on page 11.

2.2.7 Stop

Stop issues the command to stop the engine. When the command has been issued but not yet confirmed, the button blinks grey. When the engine reports that it is stopped, the button is red.

2.2.8 Set Valves

BC2 Tablet Interface supports commanding hydraulic valves when correctly configured on the engine controller as well as in BC2 Config. This manual assumes valves are already correctly set up.

Each valve is represented with a label containing the name of the valve and two buttons with the text *Open* and *Close*. The name of a valve as well as the text on each button are defined in BC2 Config. Figure 2.6a on page 15 shows what a valve looks like before being commanded for the first time. Since valve position feedback is not supported, the default state is ambiguous: the program does not know if the valve is open or closed, and as such does not guess. Only when a valve is about to be commanded or has been commanded *Open* or *Close* does the button colour change to green or red, respectively. Figure 2.6 on page 15 shows this colouring in various states.

BC2 Config supports custom naming of valve buttons – for documentation purposes, we will refer to the buttons as *Open* and *Close* but your buttons may be named differently.

Default Behaviour

When *Open* or *Close* is pressed, the command to set the valve is prepared but not sent. In this state, the background text of the name of the valve turns yellow (see Figure 2.6b on page 15) and the **Set Valves** button blinks red and black. Only when the **Set Valves** button is pressed, will the command be sent to the engine controller. Because of this, multiple valves can be commanded simultaneously.

Change Sent Immediately

The behaviour described above is the default, however BC2 Config supports an option for valves called **Change Sent Immediately** which modifies the default behaviour: instead of **Set Valves** needing to be pressed, instead, the command is sent automatically. The background text of the valve name will *not* be yellow, and the **Set Valve** button will *not* blink. Instead, the state of the valve buttons will move immediately to the commanded states, as shown in Figures 2.6c and 2.6d.

2.2.9 Pump Metrics

One of the main features of BC2 Tablet Interface is displaying engine/pump data values, or metrics. See Table 2.5 on page 15 for details.

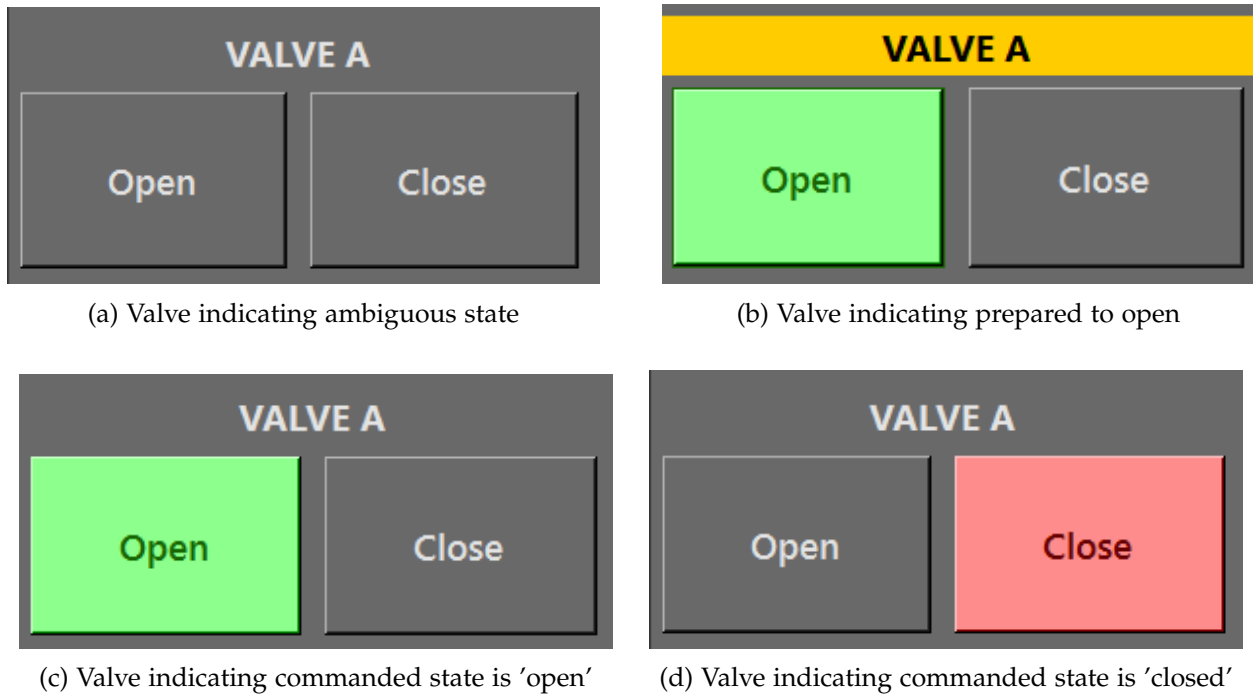


Figure 2.6: A single valve showing various visual states

Name	Meaning	Allowed Units
RPM	Engine speed	Rotations Per Minute (RPM)
P_IN	Pump inlet pressure	PSI, Kilopascal (kPa), bar, mbar
P_OUT	Pump outlet pressure	PSI, kPa, bar, mbar
OIL_PRESS	Engine oil pressure	PSI, kPa, bar, mbar
ENG_TEMP	Engine temperature	Fahrenheit, Celsius

Table 2.5: Default Metric Types

Figure 2.7 on page 16 shows (on the main display) an engine speed of 1875 RPM with elements indicated by numbers 1-4. In left-to-right order, metrics are composed of:

1. the name of the metric
2. a horizontal bar graph or meter
3. the numerical value of the metric
4. the units

In this case, because the absolute maximum displayable value is 3000 RPM, the bar graph or meter goes about 3/5 of the way.

A special case exists for handling the condition when a pump is commanded to idle: because BC2 Tablet Interface does not know the idle RPM setting on the BC2 engine controller, the RPM



Figure 2.7: Data metric example showing RPM.

metric displays its value as *IDLE* without units until a subsequent engine update is received with the actual RPM value. This choice was made to convey the intent behind the action: the engine is going to idle, even if the specific RPM value isn't accurately known.

No Data

When there is no data to display, the numerical portion of a metric is displayed as three question marks: *???*. This indicates that the value is currently unknown, due to a lack of incoming data. This will happen when starting BC2 Tablet Interface and before data is received from a pump.

In short: *???* means no data received (yet).

Invalid Data

In some cases, BC2 Tablet Interface will display numerical portions of metrics as three dashes: *---*. This indicates that data *has* been received but BC2 is indicating that the value is invalid. This can happen when BC2 is configured to read a sensor but BC2 detects that the sensor is not connected. So rather than display a default value (like zero, for example) BC2 Tablet Interface instead indicates that there is no meaningful value to display. This will also happen when BC2 is configured to emit values read from the engine's CAN bus, but for whatever reason the CAN bus is not accessible.

In short: *---* means that data has been received but there is no meaningful value to display.

Forcing Values to Update

BC2 communication is optimized for low-bandwidth communication: the engine controller only emits data when it thinks values have changed sufficiently to be of interest to the operator. When it does emit data, it does so in *packets* where values are grouped together. In previous versions of this software, there was only one packet, and pressing the **Update** button was enough to force an engine controller to respond with the current values in that one packet. As this software is still backwards-compatible with the earliest versions of BC2, the **Update** button still currently only asks the engine controller for its basic engine data.

There some situations where an operator may need to tell the engine controller to emit a specific metric. To force a specific metric to update:

1. Tap the metric and an **Update** button will appear just below where you tapped. The metric itself will be highlighted in a darker shade.
2. Press this newly-visible **Update** button. Figure 2.8 on page 17 shows this button.
3. While there is an outstanding request for a specific data value, the name of that metric will blink. If a value is not returned from the engine controller, the name will continue to blink.

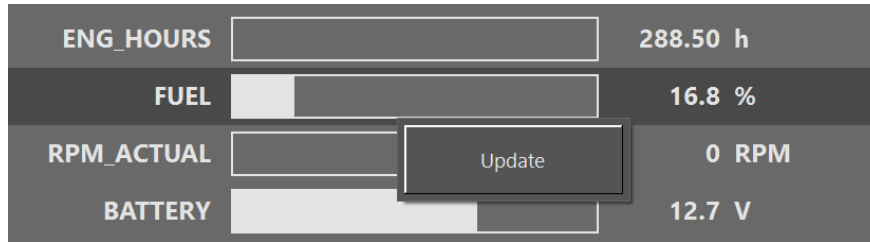


Figure 2.8: Per-metric update button.

Display Rules

Pump metrics have rules that determine their colour when drawn on the screen and whether they are accompanied by an audible alarm. Refer to the BC2 Config user manual for instructions on configuring these rules.

As an example, Figure 2.9 on page 17 shows two rules set up in BC2 Config for a pump's RPM metric. In this example, a warning state is defined for values exceeding 1850, and a danger state for values exceeding 2200. Note that the danger state is accompanied with a sound alarm. Figure 2.10 on page 17 shows what an increasing RPM value would look like with these display rules in place.



Figure 2.9: BC2 Config display rule examples.



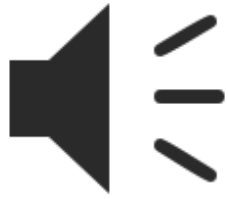
Figure 2.10: BC2 Tablet Interface display rule examples.

Audible Alarm

In Figure 2.10 on page 17, note the appearance of the button at the right of the RPM value in 'danger'. The appearance of this button always accompanies an alarm, whether audible or silenced. When pressed, this button acknowledges the alarm and silences it. Once silenced, an alarm will stay silent until the condition causing the alarm ends. If the condition causing the alarm ends and then resumes, the alarm will resume also.

Figure 2.11 on page 18 illustrates the appearance of the alarm icon when audible and when silenced.

Effective use of the audible alarm requires that the volume on the tablet computer be set loud enough for the alarm to be heard within the operating environment (eg., tractor cab.)



(a) Alarm is audible (not silent).



(b) Alarm has been acknowledged and is silent.

Figure 2.11: Alarm icon states.

2.3 Viewing and Selecting Pumps on the Side Bar

The side bar (shown as 2 in Figure 2.1 on page 4) lists all enabled and configured pumps, as defined in BC2 Config. Each entry has the name of the pump, followed beneath by those data values configured for displaying in the side bar. Tap a pump entry to select it. When a pump entry is selected, it becomes visible in the main display (shown as 3 in Figure 2.1 on page 4.) Only one pump entry can be selected and displayed at a time.

If there are enough pump entries to fill the entire side bar, slide the sidebar upwards with your finger to “scroll”. To avoid this situation, you may decide to disable some data values for some pumps. Even though a data value is not visible in the sidebar, it can still be visible in the main display.

If a pump appears to be missing, check that it is present *and enabled* in BC2 Config.

2.3.1 Drawing Behaviour

When a pump metric value changes, it will blink several times. This provides visual feedback that something has changed, and makes it easier to notice changes even when you are not looking directly at the screen.

Additionally, the pump names are coloured to match the current known state. By default, the colour is grey, but when starting and the **Start** button is blinking gold, the text of the pump entry in the side bar blinks with the same colour. This happens so that there is visual feedback of what a pump is doing, even if it is not currently selected and displayed on the main display. In addition to displaying the ‘starting’ state, the red **Stop** button state is mirrored on the pump entry title, as are the states of the **Idle**, **Set RPM**, **Set Cruise** buttons as well.

2.4 Per-Pump Communication Icons

In addition to the communication icons in the status bar described in Section 2.1 beginning on page 4, there are also icons (when enabled on the engine controller) that indicate the state of communication of an engine controller and the tablet’s connection to it. This documentation will refer to these as *per-pump communication icons* to differentiate them from the larger icons that indicate the connectivity of *this* tablet.

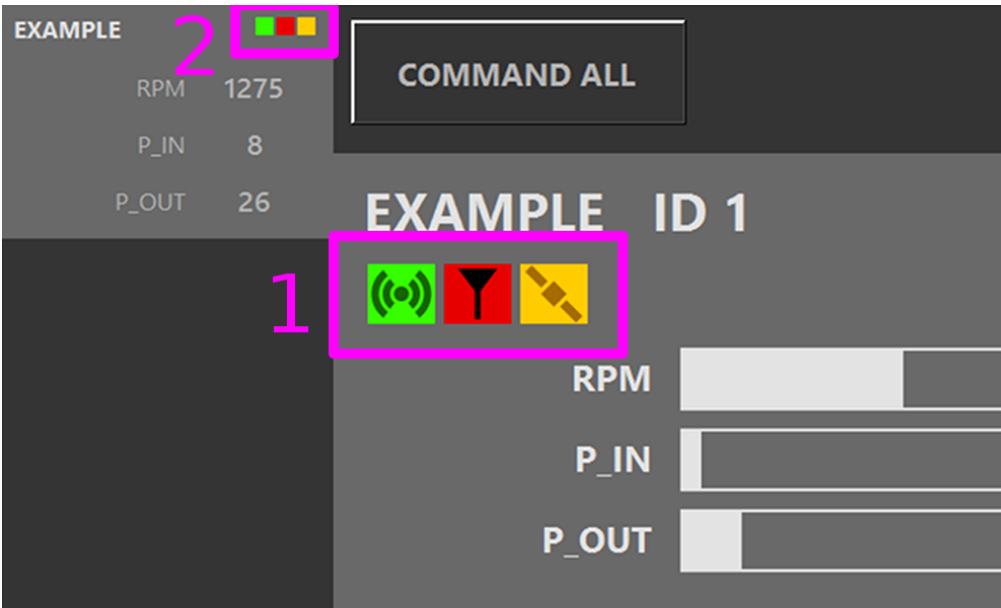


Figure 2.12: Per-pump communication icons (1) and sidebar indicators (2).

Icon	Sidebar	Colour	Meaning
		black	Engine controller does not consider the SkyWave module to be plugged in.
		red	SkyWave module plugged in, but cell communication not available (<i>for example, no cell signal or unmounted/missing antenna.</i>)
		green	OK—cell communication is available on engine controller.

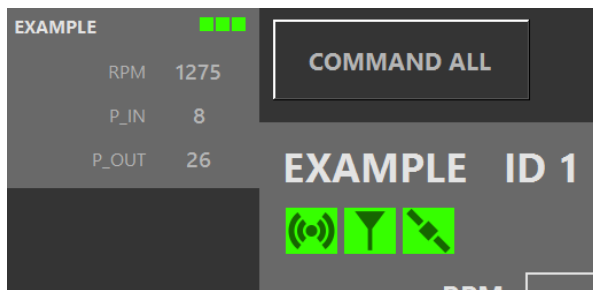
Table 2.6: Per-pump cell communication icon states.

Icon	Sidebar	Colour	Meaning
		black	Engine controller does not consider the SkyWave module to be plugged in.
		red	SkyWave module plugged in, but satellite communication is not available (<i>for example, no satellite signal, unmounted/missing satellite antenna.</i>)
		yellow	SkyWave module plugged in, but a satellite connection has not been fully established. The SkyWave module <i>does</i> have a GPS fix, indicating that the antenna is wired correctly. If this persists, verify that antenna is positioned properly.
		green	OK—satellite communication is available on engine controller.

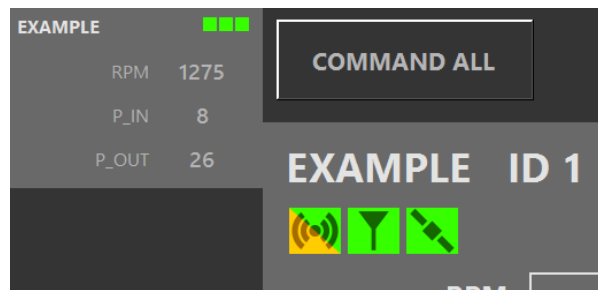
Table 2.7: Per-pump satellite communication icon states.

Icon	Sidebar	Colour	Meaning
		red	Engine controller does not consider radio to be plugged in.
		yellow	Radio plugged in and working, but engine controller has not seen any BC2 radio traffic in the last minute.
		yellow	Engine controller radio OK and seeing recent BC2 traffic but is out of range of this tablet.
		green	Engine controller radio OK and <i>not</i> seeing recent BC2 traffic but is still communicating via radio to tablet.
		green	Engine controller radio seeing recent BC2 radio traffic.
		green	Engine controller sent data to this tablet via radio just now.
		pink	Engine controller is currently communicating with a BC1 remote.

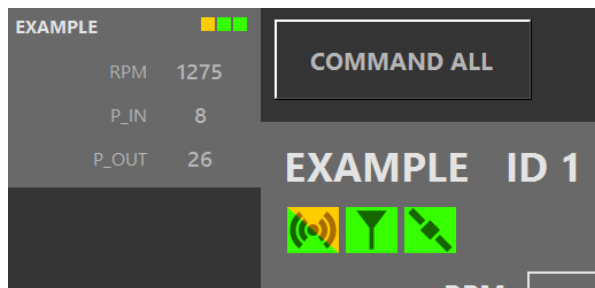
Table 2.8: Per-pump radio communication icon states.



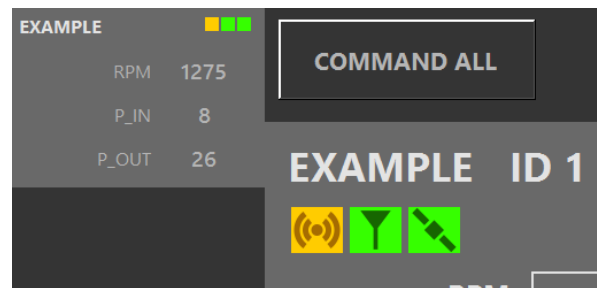
(a) Pump connection icons showing good radio, cell and satellite communication.



(b) Pump *not* seeing other radios recently but still communicating via radio to tablet.



(c) Pump seeing other radios recently but *not* communicating via radio to tablet.



(d) Pump *not* seeing other radios recently and also *not* communicating via radio to tablet.

Figure 2.13: Typical per-pump radio icon states and sidebar indicators.

The per-pump communication icons appear twice for each pump: in the main display area as well as in the sidebar. The sidebar indicators are smaller and display as a solid colour. Generally, icons that go from a better state to a worse state (for a example, a cell connection dropping away) will blink briefly. Figure 2.12 on page 19 shows an example pump with its per-pump communication icons (labelled 1) and its sidebar indicators (labelled 2). The icons appear left-to-right in the following order: radio, SkyWave cell, SkyWave satellite.

The sidebar indicators summarize the state of communication with a pump: generally, green means good, yellow means “potential problem” and red or black means “definite problem.”

2.4.1 Radio Icon

The per-pump radio icon provides a great deal of useful information about how connected a pump is to a tablet, and is a useful tool for troubleshooting poor or absent radio communication. Table 2.8 on page 20 describes these states.

When troubleshooting radio communication, the per-pump radio communication icon is very useful, *provided that cell and/or satellite communication are also working*. It is important to point out that multiple methods of communication are required in order for BC2 Tablet Interface to detect a problem; if the only method of communication in use is radio and radio communication stops working, the program will be unable to accurately report the state of communication. Ensuring that multiple methods of communication (cell and satellite in addition to radio) makes troubleshooting much easier when one of those methods stops working as expected.

The per-pump radio icon is most useful when radio, cell, and satellite communication are set up properly on all units.

Refer to Figure 2.13 on page 21 shows four typical per-pump radio icon scenarios.

Out of Range

It is not uncommon for a pump to be in range of other pumps but to be out-of-range of the tablet; Figure 2.13c illustrates this situation. Notice that the icon is half yellow and half green, with yellow being on the top-right half, and also notice that the corresponding sidebar indicator is yellow: this indicates a less-than-ideal state as the tablet knows it is no longer in contact with this particular pump via radio.

In Range, but Pump Not Receiving Traffic Recently

Contrast the previous situation with Figure 2.13b which shows the opposite case: the pump has not recently seen traffic from other BC2 radios, but is still communicating to the tablet via radio. In this situation, the corresponding sidebar indicator is green, indicating an ideal state: the tablet is receiving data from the pump, indicating that it is still in range.

If the two diagonal per-pump radio icon states are confusing, look at the sidebar indicators: green means that the tablet is still in range of the pump, while yellow means that it is not in range (or there is a reception problem) and that communication is now relying on other methods (ie., cell/sat.)

2.4.2 Cell Icon

The per-pump cell icon indicates whether a cell connection is available or not for a particular pump. If the SkyWave module is not plugged in or powered at all, the cell icon indicates with an *un-plugged* state. Table 2.6 on page 19 describes these states.

2.4.3 Satellite Icon

Similar to the cell icon described above, the per-pump satellite icon indicates whether a satellite connection is available or not for a particular pump. Additionally, GPS availability is reflected in a yellow icon state. This is useful since a satellite connection can take upwards of a minute to develop, whereas a GPS fix is developed relatively quickly in comparison. Having a GPS fix indicates that, at the very least, the satellite antenna is plugged into the SkyWave module, and typically precedes the state indicating a valid satellite connection. Table 2.7 on page 20 describes these states.

Chapter 3

About

The About dialog window provides information about BC2 Tablet Interface.

To open the About dialog window, tap the menu button (described in section 2.1.11 on page 10) and then tap **About**. This dialog window describes:

- the program name
- the version number (in the form of x.x.x.x)
- when the program was built or compiled
- a long hexadecimal string indicating the unique fingerprint of this version (this changes automatically when we release new versions)
- the location of the program log and a button to view it (described in Section 3.1 on page 23)
- the URL of the SunovaWorX support website
- copyright information

3.1 Program Log

BC2 Tablet Interface maintains a program log, created new each time it runs, where ordinary information is written as well as information about errors that occur. In situations where SunovaWorX needs your help in diagnosing problems with BC2 or BC2 Tablet Interface, you may be asked to share this log file.

The About dialog window describes where in the file system the log file is located, and provides a handy button for opening it using the Notepad that is included with Microsoft Windows.

Chapter 4

Software Updates

While the process of updating BC2 Tablet Interface is intended to be simple and easy, it is strongly advised that operators carefully choose when and where the software is updated. For example, *between* pumping jobs, rather than *during* one.

BC2 Tablet Interface supports near-automatic remote updates via the Internet. When SunovaWorX issues a program update, it is available to download and install from within BC2 Tablet Interface. BC2 Tablet Interface is part of a suite (collection) of programs that includes BC2 Config and other tools – these are all updated together in a single package.

For updating the software to be possible, the following conditions must be met:

- An update is available for download.
- The tablet must have Internet access (WiFi, Ethernet, SIM card, etc.)
- The available update is a newer version than what is currently installed.

With these conditions satisfied, the menu button (described in section 2.1.11 on page 10) will change to a gold colour. When the menu button is pressed, a gold-coloured button titled **Update** will be visible. Figure 4.1 on page 25 shows what this looks like.

To update BC2 Tablet Interface,

1. Tap the **Update** button. (If not present, then the conditions described above are not met.)
2. You will be asked to confirm that you want to update *now*. Tap **Yes** to confirm.
3. Wait while BC2 Tablet Interface closes, updates, and re-opens.

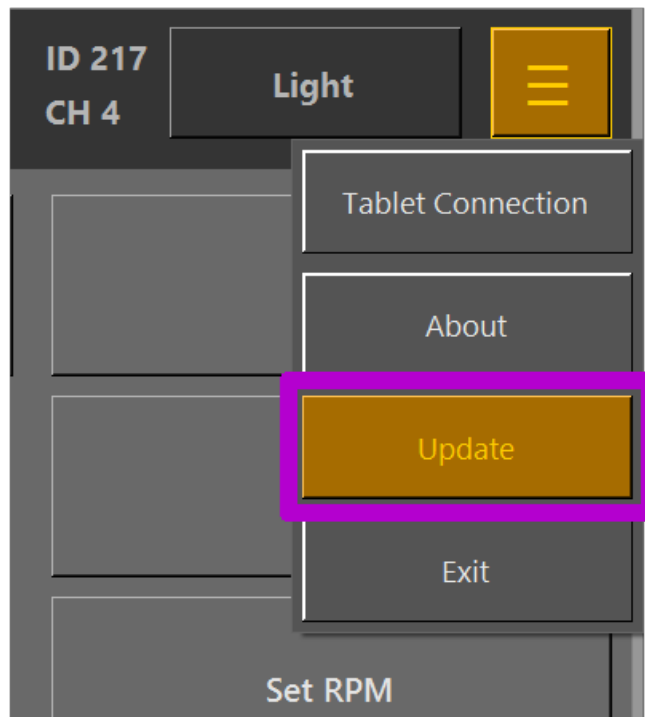


Figure 4.1: Update Button

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Version History

	2020-04-28	*	Added section on per-metric update button.
v2020	2020-03-23	*	Fixed history formatting.
	2020-03-18	*	Updated glossary.
	2020-03-12	*	Fixed duplicate index items.
	2019-08-07	*	Documented yellow radio icon state, indicating lack of recent incoming radio data.
	2019-08-06	*	Added additional documentation of per-pump connection icons.
	2019-08-05	*	Documented per-pump communication icons.
	2019-08-05	*	Updated common images.
	2019-08-05	*	Reorganized procedures.
	2019-07-25	*	Updated template.
	2019-07-22	*	Updated bibliography, glossary, and template.
	2019-04-26	*	Updated document build system.
	2019-04-26	*	Updated program icon image.
	2019-04-26	*	Added title image and improved icon figure.
v2019	2019-04-17	*	Added information regarding BC1 Compatibility.
	2019-03-22	*	Updated build script.
	2019-03-06	*	Documented the addition of second favorite button.
	2019-03-01	*	Updated glossary.
	2019-03-01	*	Updated radio icons and added information about BC2 Config button.
v1	2018-11-27	*	Added indexing items.
	2018-11-08	*	Added content describing valves.
	2018-11-08	*	Glossary changes.
	2018-11-01	*	Added display rule content.
	2018-10-31	*	Added pump metric content.
	2018-10-31	*	Additions to pump cruise.
	2018-10-30	*	RPM and Cruise content.
	2018-10-29	*	Status bar and sidebar content added.
	2018-10-29	*	Submodule changes.
	2018-06-05	*	Some initial data entry.
	2018-06-05	*	Initial commit.

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Acronyms

BC2 Broadcaster 2 11, 12, 15, 16, 23

kPa Kilopascal 15

PSI Pounds per Square Inch 12

RPM Rotations Per Minute 15

Glossary

bar	A unit of pressure equal to 100 kPa, or 14.5038 PSI.	15
BC2	Broadcaster 2 (BC2). The name of SunovaWorX' Remote engine controller system, which supercedes the earlier Broadcaster 1 remote engine controller.	11, 12, 15, 16, 23
BC2 Config	The software configuration tool for BC2 Tablet Interface.	2, 6, 10, 11, 13, 14, 17, 18, 24, 29
BC2 Tablet Interface	Previously called 'BC2Gui'. The software program designed for tablet computers, providing command and control of Broadcaster 2 remote engine controllers.	2, 4, 10, 11, 14–17, 23, 24, 28, 29, 31, 32
cavitation	A physical phenomenon that occurs in fluids whereby bubbles or voids are created in low pressure conditions, followed by the violent collapse of those bubbles due to high pressure. Cavitation is a major cause of wear (for example, on pump impellers).	12
kPa	Kilopascal (kPa). The pascal (symbol: Pa) is the SI derived unit of pressure used to quantify internal pressure. It is defined as one newton per square metre. One kilopascal (kPa) is equal to a thousand pascals (Pa).	15
main display	Within BC2 Tablet Interface, this the area in the centre of the screen showing a detailed view of a single pump, selected from the side bar.	4, 11, 15, 18, 32

mbar	A unit of pressure equal to 0.1 kPa, or 0.0145038 PSI.	15
PSI	Pounds per Square Inch (PSI). A unit of pressure or of stress based on avoirdupois units. It is the pressure resulting from a force of one pound-force applied to an area of one square inch.	12
pump cruise	A control system feature of Broadcaster 2 where engine speed is determined by an inlet pressure range.	12
pump entry	This document uses <i>pump entry</i> to distinguish an item defined in BC2 Tablet Interface from an actual, real-world pump.	18
radio channel	For radio communication, this number corresponds to the common radio wave frequency on which a group of devices communicate. For cell/sat communication, the effect is the same: only devices sharing this number can communicate with each other.	10, 32
RPM	Rotations Per Minute (RPM). A measure of the frequency of a rotation. It annotates the number of full rotations completed in one minute around a fixed axis. It is used as a measure of rotational speed of a mechanical component.	15
side bar	Within BC2 Tablet Interface, this is the area to the left of the screen showing the list of pumps. This is contrasted with the main display which shows a detailed view of a single pump selected in the side bar.	4, 18, 31, 32
status bar	Within BC2 Tablet Interface, this the area at the top of the screen that indicates the status and state of various connected devices, as well as the Command All button and program menu button.	4, 5, 10, 18
SunovaWorX	The manufacturer of Broadcaster 2.	23, 24
tablet ID	The number that uniquely identifies a tablet computer within a radio channel. This number is used as an address for determining where radio and cell/sat traffic should be routed.	10

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